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Wind and turbulence measurements by a differential absorption and wind Doppler lidar in an urban boundary layer

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The measurements of the urban boundary layer (UBL) have long been performed with traditional in situ sensors mounted on towers, sondes and instruments mounted on aircraft. But these methods are difficult to measure continuously the full depth of the UBL. Since there have been significant advances in remote sensing techniques, which includes wind profilers and Doppler lidars, can achieve continuous coverage with high resolution and simultaneous measurement at all altitudes across a significant part of the lower atmosphere, including the full depth of the UBL, remote sensing has been a useful tool for observing the UBL.

A coherent 2-micro m differential absorption and wind Doppler lidar was developed to measure CO₂ concentration and radial wind velocity at NICT. To evaluate the performance of wind measurements by the Doppler lidar, we will conduct simultaneous observations of wind field with wind profilers and GPS sondes at the NICT headquarters located in the Tokyo metropolitan area in February 2010. In addition we will evaluate the performance of turbulent measurements by the Doppler lidar. In presentation, we report the summary and preliminary results of the simultaneous observation.

Keywords: Urban boundary layer, Doppler lidar, Wind profiler, GPS sonde